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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/571,287

12/13/2006

Koichiro Ueno

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8132

22852

7590

08/18/2009

FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER  
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EXAMINER

GREEN, TELLY D

ART UNIT

PAPER NUMBER

2822

MAIL DATE

DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/571,287	<b>Applicant(s)</b> UENO ET AL.	
	<b>Examiner</b> TELLY D. GREEN	<b>Art Unit</b> 2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 30 April 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 13-18 is/are pending in the application.
- 4a) Of the above claim(s) 1-12 and 19-28 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 13-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 March 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10/16/08, 3/14/08, 11/13/07 and 12/13/06</u> .                | 6) <input type="checkbox"/> Other: _____                          |



## DETAILED ACTION

### *Election/Restrictions*

Applicant's election without traverse of Group I, Species 13, claims 13-18 in the reply filed on April 40, 2009 is acknowledged. Claims 1-12 and 19-28 have been withdrawn from consideration. Action on the merits is as follows:

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims **13-18** are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al. (Tanaka) (**JP 2000-208830 Abstract**) in view of Bethea et al. (Bethea) (**US 4,599,632**).

**In regards to claim 13**, Tanaka (**Abstract**) discloses an infrared sensor comprising: a substrate (**item 1**); and a compound semiconductor stacked layers (**items 2 and 3**) formed on said substrate by stacking a plurality of compound semiconductor layers, said compound semiconductor stacked layers comprising: compound semiconductor layer, compound semiconductor layer, that is a non-doped or p-type doped material (**Zn**) including indium and antimony (**Abstract**), but does not specifically disclose a sixth compound semiconductor layer that is n-typed doped material, a seventh compound semiconductor layer, and an eighth compound semiconductor layer.

Bethea (**col. 3, lines 45-55**) discloses an n-type dope material (Sn)

Therefore it would have been obvious to one of ordinary skill at the time of the invention to modify the dopant of Tanaka with the n-type dope material Bethea for the purpose of carrier mobility.

Tanaka as modified by Bethea does not specifically disclose a sixth, seventh, or eighth compound semiconductor layer.

It would have been obvious to modify the invention to include multiple layers for the purpose of carrier mobility and optimum performance, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art (St. Regis Paper Co. v. Bemis Co., 193 USPQ 8).

2. Claims **14-18** are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al. (Tanaka) (**JP 2000-208830 Abstract**) in view of Bethea et al. (Bethea) (**US 4,599,632**) as applied to claim 13 above and further in view Inada et al. (Inada) (**US 5,037,769**).

**In regards to claim 14**, Tanaka (**Abstract**) discloses wherein a compound semiconductor layer is InSb, a compound semiconductor layer (**items 2 and 3**) is one of InSb, InAsSb and InSbN (**items 2 and 3**), but does not specifically disclose a compound semiconductor layer is either AlInSb or GaInSb, or one of AlAs, InAs, GaAs, AlSb and GaSb, or a mixed crystal of those.

Inada (**col. 11, lines 1-49**) discloses a multilayer structure wherein the compound semiconductor layer is either AlInSb or GaInSb, or one of AlAs, InAs, GaAs, AlSb and GaSb, or a mixed crystal of those.

Therefore it would have been obvious to one of ordinary skill at the time of the invention to modify the compound semiconductor layer of Tanaka with the compound semiconductor layer Inada for the purpose of high speed and frequency.

**In regards to claim 15**, Tanaka (**Abstract**) discloses wherein a p-type dopant for said compound semiconductor layers is Zn, but does not specifically disclose an n-type dopant for a compound semiconductor layer is Sn.

Bethea (**col. 3, lines 45-55**) discloses an n-type dope material (Sn) for a compound semiconductor layer.

Therefore it would have been obvious to one of ordinary skill at the time of the invention to modify the dopant of Tanaka with the n-type dope material Bethea for the purpose of carrier mobility.

**In regards to claim 16**, Tanaka (**Abstract**) discloses wherein compound semiconductor stacked layers (**items 2 and 3**) which is a material including indium and antimony and is p-type doped (Zn) at a carrier density equal to or greater than the carrier density of said another compound semiconductor layer.

**In regards to claim 17**, Tanaka (**Abstract**) discloses a compound semiconductor layer is InSb.

**In regards to claim 18**, Tanaka (**Abstract**) discloses wherein a p-type dopant for said compound semiconductor layer is Zn.

### **Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TELLY D. GREEN whose telephone number is (571)270-3204. The examiner can normally be reached on Monday thru Friday 7:30 AM - 5:00 PM EST..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on 571-272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Zandra V. Smith/  
Supervisory Patent Examiner, Art  
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/Telly D Green/  
Examiner, Art Unit 2822  
August 16, 2009